

THURSDAY, OCTOBER 31, 1872

THE GREAT CIRCUMNAVIGATING EXPLORING EXPEDITION

PREPARATIONS for the expedition which is about to be despatched by the Admiralty for the purpose of dredging, sounding, and otherwise scientifically investigating, the deep sea, have been for some months past in active progress, and are now rapidly approaching completion. The vessel set apart for the purpose is H.M.S. *Challenger*, a main-deck corvette of 2,306 tons, now lying at Sheerness. Her commander is Capt. G. S. Nares, R.N., well known as the author of a valuable work on seamanship, greatly in use in the Royal Navy. Capt. Nares has seen a great deal of active service, including exploration in the Arctic regions, and he has left the charge of the Survey in the Gulf of Suez for the purpose of taking charge of the present expedition. Second in command is Commander J. P. Maclear, R.N., son of Sir Thomas Maclear, late Astronomer Royal at the Cape of Good Hope, who has also seen a great deal of service in various parts of the world, and whose name is familiar to our readers from his having taken part in the Eclipse Expedition to Spain, and also in that to Ceylon. Commander Maclear will undertake the magnetic observations, which will form part of the work of the Expedition. The other naval officers are—1st Lieut., Pelham Aldrich; 2nd Lieut., Arthur C. Bromley; 3rd Lieut., George R. Bethell; Navigating Lieut., Alfred E. Tizard; Sub-Lieutenants, H. C. Sloggett and Lord George Campbell; Pay-master, R. R. Richards; Chief Engineer, James H. Ferguson.

On the scientific staff of the Expedition, the following have received appointments from the Admiralty, bearing date Oct. 1872:—Prof. Wyville Thomson, F.R.S., &c., Director of the Scientific Staff. Under him the following have been appointed:—Mr. J. J. Wild of Zurich, who will accompany Prof. Wyville Thomson as private secretary. (Mr. Wild was for some time private secretary to the Abbé Moigno, and is an accomplished artist); Mr. J. Y. Buchanan, M.A., Edinburgh, Chemist to the Expedition. (Mr. Buchanan has been until now Senior Assistant in the Chemical Laboratory of Edinburgh University, and has had the advantage of pursuing the study of his subject in Germany, at Leipzig and elsewhere); Mr. H. N. Moseley, M.A., Oxon, Naturalist (Mr. Moseley is a pupil of Prof. Rolleston, and has been enabled, by a Radcliffe Travelling Fellowship, to study biology further at Vienna and Leipzig: he was a member of the late Eclipse Expedition to Ceylon); Dr. Von Willemoes Suhm, Naturalist (Dr. Von Willemoes Suhm, who has been some time Assistant to Prof. Von Siebold, of Munich, is a distinguished naturalist, and is well known from his papers in Siebold and Kölliker's "Archiv" on Annelids); Mr. John Murray, of Edinburgh University, Naturalist (Mr. Murray, a Canadian by birth, has had great experience in taxidermy and the collection and preservation of Vertebrata generally, has travelled in Canada, and has also been far into high latitudes on a whaling cruise). Prof. Wyville Thomson will of

course devote all his time not consumed by the superintendence of the scientific investigations in their various branches, preparations of reports, &c., to zoological work.

Of the three Naturalists, Dr. Von Willmoes Suhm and Mr. Moseley will undertake especially the Invertebrata procured during the expedition, whilst Mr. Murray will direct his attention principally to the Vertebrata. Mr. Moseley will also undertake botanical collection whenever an opportunity presents itself of landing in interesting localities, and all the scientific staff will give to this branch of biological investigation as much of their time as possible. Algæ, &c., obtained by dredging and otherwise at sea, will also be entrusted to Mr. Moseley. An experienced photographer, a noncommissioned officer of Engineers, forms one of the party. The expedition is under the immediate direction of the hydrographic department of the Admiralty.

The Admiralty authorities having applied to the Royal Society for advice in the conduction of the expedition, a committee of the Society was formed for the purpose of considering the subject, and counselling the Admiralty in the matter. The Committee consists of the President and Officers of the Royal Society, with Dr. Carpenter, Dr. Frankland, Dr. Hooker, Prof. Huxley, the Hydrographer of the Admiralty, Mr. Gwyn Jeffreys, Mr. Siemens, Sir William Thomson, Prof. Wyville Thomson, Dr. Williamson, and Mr. Alfred R. Wallace, and has the power of adding to its number.

The *Challenger* has had her timbers put in thorough repair, and has been specially fitted out for the work for which she is intended. She has an auxiliary screw, with engines of 400-horse power (nominal), and carries about one month's coal. She carries two cutters, a steam pinnace, a South Sea whaling or surf boat, a jolly boat, two gigs, and a dingy. Stages have been erected amidships, from which the dredges will be worked, and immediately aft of the stages is the steam winding-in apparatus. Prof. Wyville Thomson has been several times down to the ship to give directions for the special arrangements for scientific work. The fore magazine is prepared for the stowage of the large quantity of spirits which will be required for the preservation of natural history specimens, and of the many thousand stoppered bottles which will contain them. A chemical laboratory and naturalist's workroom have been fitted up in the afterpart of the vessel; and spirit is laid on to the workroom by means of a pipe leading from a metal cistern placed in the nettings. Several hundred miles of best whaling line have been prepared at Chatham for the *Challenger*, for dredging, and she carries about forty dredges. Amongst the stores are traps of various forms, harpoons, a harpoon gun, and fishing tackle of all kinds, including trawls, trammels, a seine, shrimp-nets, fish-traps, and lobster-pots. From the latter, used in deep water, great results are expected; and it is not improbable that living specimens of *Nautilus* may thus be procured. Prof. Wyville Thomson is now superintending the construction, in Edinburgh, of the various forms of apparatus required for physical research. Several beautiful instruments of this nature have been devised by Mr. Buchanan; and notably a new deep-sea pressure-gauge, and an instrument for bringing up samples of water from the bottom, which is provided with two taps which are closed by the contact of the apparatus with

the bottom, and a safety-valve to allow of the expansion consequent on decrease of pressure as the apparatus is hauled up. A hydraulic machine will be carried on board, capable of testing the accuracy of all the physical apparatus, thermometers, pressure-gauges, &c., from time to time, in a chamber in which a pressure of three tons on the square inch can be obtained. The attempt will be made to use piano wire for sounding, after Sir William Thomson's method. A small aquarium has been devised by Mr. Moseley, which will be used for the study of the development of interesting animals. Except in absolutely calm weather it will be entirely closed, and a constant stream of water will be passed through it from a reservoir by means of finely perforated roses made—at the suggestion of Mr. Lloyd, of the Crystal Palace—of vulcanite. The route to be followed by the *Challenger* is not yet definitely fixed, and is still under the consideration of the Admiralty, who will be guided very much in the matter by the advice of the Royal Society Committee; but it will be very nearly as follows:—

The vessel, which is at present at Sheerness, will probably go round to Portsmouth about the middle of November, and sail from thence in the beginning of December for Gibraltar, the first haul of the dredge being made in the Bay of Biscay, if the weather should chance to be favourable. From Gibraltar she will proceed to Madeira, thence to St. Thomas, the Bahamas, Bermuda, the Azores; from thence to Bahia, touching at Fernando Noronha; then across to the Cape of Good Hope, and, after a stay in that neighbourhood, southwards to the Crozetts and Marion Islands and Kerguelens Land. A run southwards will then be made as far as possible to the ice, and the course thence be made to Sydney. New Zealand, the Campbell and Auckland groups, Torres Straits, New Guinea, and New Ireland will then be visited. A long cruise of perhaps a year will then be made amongst the Pacific islands; thence the expedition, passing between Borneo and Celebes, and visiting Luzon and its neighbourhood, will proceed to Japan, where a stay of two or three months is expected. Thence northward to Kamtskatka, whence a run will be made northwards through Behring's Straits, and then through the Aleutian Islands, southward to Vancouver's Island, and so through the deep eastern region of the Pacific by Easter Island, and possibly by the Galapagos Archipelago to the Horn, and thence home. The voyage is expected to take about three and a half years.

It is difficult to over-estimate the immense benefit which science must derive from an expedition such as this. Apart from the results of intense interest which may be expected from the deep-sea work, the principal object of the expedition, and which must go far to elucidate a subject on which our knowledge is at present of the most imperfect description, abundant opportunity will offer for the accurate investigation of the animal and vegetable life of many highly interesting and yet imperfectly known or totally unexplored regions. The investigation of the floras of such islands as Fernando Noronha and the Marion and Crozett groups cannot fail to yield most instructive results; and it is needless to speak of the intense interest which centres in New Guinea.

No expedition has ever started under such favourable auspices as the present for yielding valuable scientific results, and great praise is due to the Government for the very liberal and thorough manner in which all arrangements have been carried out.

FIGUIER'S VEGETABLE WORLD

The Vegetable World: being a History of Plants, with their structure and peculiar properties. Adapted from the work of Louis Figuier. New and Revised Edition, with 473 Illustrations. (London: Cassell, Petter, and Galpin.)

NOTWITHSTANDING its ambitious title, this is, on the whole, a satisfactory book. If, however, in dependence on the title, it is ordered in the expectation of finding anything that will replace Lindley's "Vegetable Kingdom," or Baillon's "Histoire des Plantes"—at least, what this latter will be when finished, if it ever is finished—the purchaser will be disappointed. We have here a repetition of the old plan of attempting to compress into one small octavo volume an account of the Morphology, Physiology, Classification, and Geographical Distribution of plants. As far as can be, as we have said, the execution is good; some parts are even exceptionally well done; the defects are those of the plan. The style of Figuier's original work, florid and Gallic to excess, is entirely unsuited to the English reader; the "adapter" has used his pruning-knife with judicious severity, and has produced a book that may fill a useful place in popularising the study of botany, and leading the way to fuller and more special treatises.

The first part of the work, "Organography and Physiology," treats of the structure and different forms of the various organs in a systematic manner, and yet with a fresher style than is usual in text-books. It is, moreover, a relief to find that the majority of the illustrations, which are excellent throughout, are not those which have wearied the eye in many a familiar book. The details of terminology are relieved by information on many interesting points which we do not find in ordinary text-books. Thus in the very early pages we have an account of Knight's and Dutrochet's experiments with vertical and horizontal wheels to determine the effect which gravitation exercises in determining the downward tendency of the roots. Further on is a description and drawing of Hales' apparatus for measuring the force of ascending sap, by which he claims to have determined that the force which impels the sap in the vine is five times as great as that which impels the blood through the large arteries of the horse.

The portion devoted to the "Phenomena of Fertilisation and Germination" is full, and about the best in the book, the illustrations being especially superior to those found in most other works of a similar character. The cut here reproduced (Fig. 2) represents the very curious arrangement by which the fertilisation of *Vallisneria spiralis*, a favourite water plant in aquaria, is effected. The female flowers are borne on long spiral stalks which uncoil when the flower is ready to open, so as to allow it to float on the surface of the water. The male flowers, on the contrary, have very short stalks which are entirely submerged, but detach themselves when mature, rising to the surface,